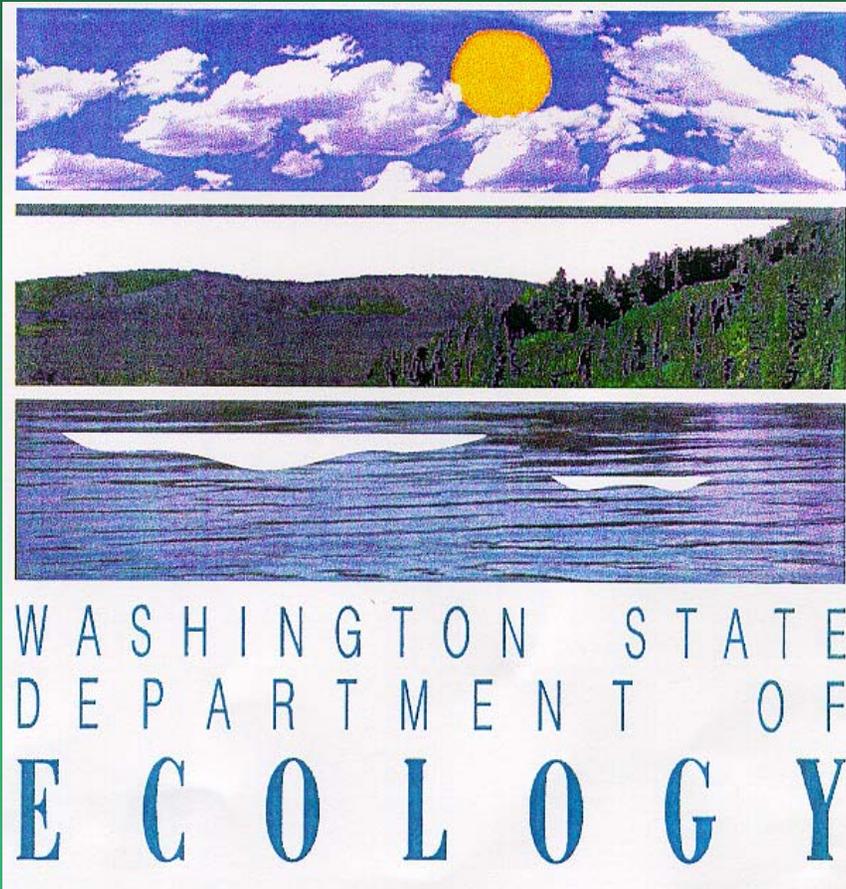


Sediment Management in Washington State



Thomas H. Gries
Senior Sediment Specialist
Sediment Management Unit
Toxics Cleanup Program
360-407-7536
tgri461@ecy.wa.gov

Copyright 2002 by Randy Glasbergen. www.glasbergen.com



“Before I begin, I’d just like to make it known that I didn’t volunteer to do this presentation.”

Sediment Management in Washington State

Part 1 History

**Part 2 Overview of Sediment
Management Standards (SMS) Rule**

Part 3 Navigation Dredging

Part 4 Sediment Source Control

Part 5 Sediment Cleanup

Part 6 Lessons Learned

Sediment Management in Washington State

PART 1 - Origin #1 of SMS Rule

- “Bad news and an ugly site”
 - NOAA studies find Puget Sound flatfish have toxic compounds in tissues and organ lesions (early 1980s)
 - EPA/CERCLA lists priority sediment site - Commencement Bay Tideflats (1983)
 - Led to development of sediment quality values (SQVs) for use as cleanup goals

Sediment Management in Washington State

PART 1 - Origin #2 of SMS Rule

- “Money, mandate and a plan”
 - Puget Sound Estuary Program administers National Estuary Program funding (1984)
 - Legislature creates Puget Sound Water Quality Authority (1985), which releases first Puget Sound Plan (1987)
 - Second plan adopted by NEP as Comp. Conservation & Management Plan

Sediment Management in Washington State

PART 1 - Origin #3 of SMS Rule

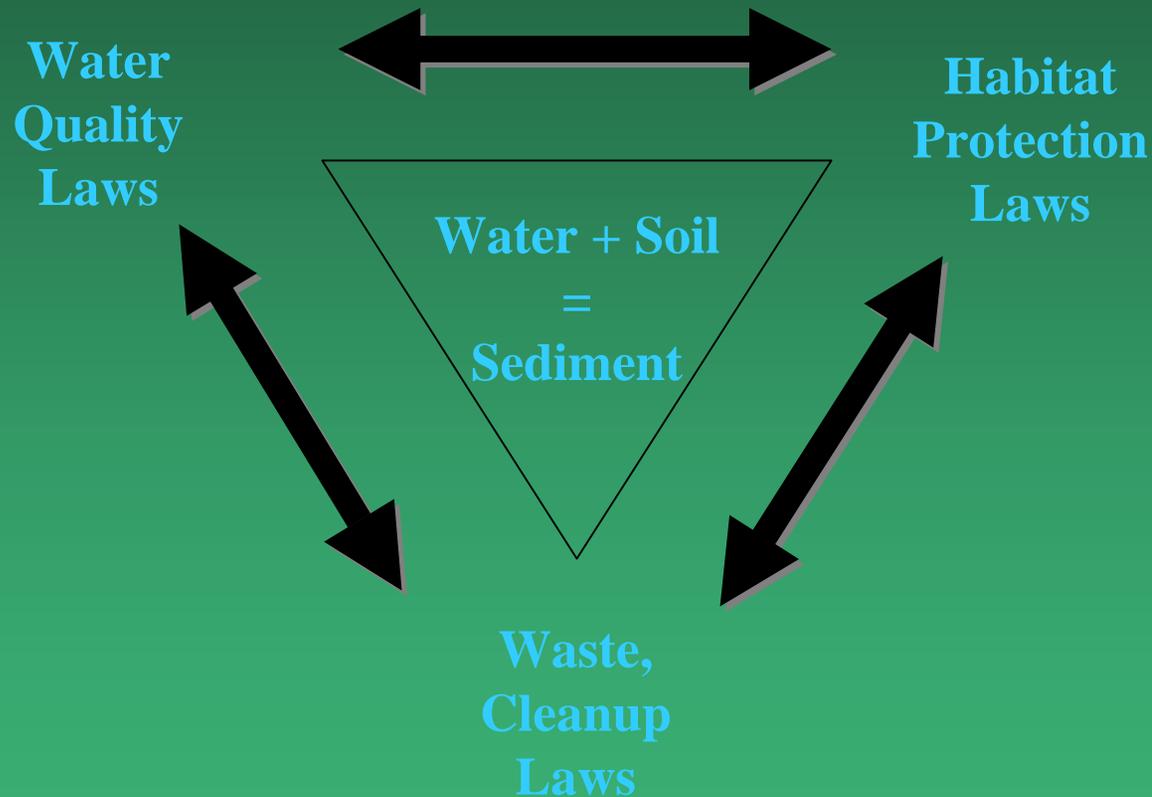
- “Crisis management”
 - Moratorium on disposal of dredged material from navigation projects
 - Corps/EPA fund development of interagency Puget Sound Dredged Disposal Analysis program (PSDDA Final EIS, 1988)

Sediment Management in Washington State

PART 1 - Origin #4 of SMS Rule

- “Irreproducible Crucible”
 - Crises, funding, mandate and plan ...
 - Relatively few sediment experts
 - High profile project-driven scientific advances
 - Smart, independent consultants
 - Recognition of important regulatory linkages

Sediment Management Regulatory Linkages



Sediment Management in Washington State

PART 1 - Regulatory Focus

- What should Sediment Management Standards (SMS) rule include?
 - Dredging, source control and cleanup
- What shouldn't be included?
 - Provisions having inadequate scientific basis (rule should “reserve” some sections)
 - Redundancies (rule should refer to other regulations where appropriate)

Sediment Management in Washington State

PART 1 - Process

- Clear scope and implications
- Predictability and flexibility
- Inclusive public process
- Good participation
- Clear final decision authority

Sediment Management in Washington State

PART 1 - Implementation

- SMS rule (173-204 WAC)
- Accompanying guidance documents
- Multiple funding sources
- Experienced staff
- Routine coordination
- Periodic program/rule reviews

Sediment Management in Washington State

PART 1 - Recommendations

- WA history not all applicable to CA
- Be guided by what's unique to CA today
- The obvious: recognize “drivers”; clear scope; good stakeholder involvement; sound science; listen; be responsive ...

Sediment Management in Washington State

PART 1 - Recommendations

- In addition, CA “policy” should provide:
 - Clarity about level(s) of protection afforded
 - Appropriate links to related regulations
 - Narrative standards as well as ...
 - Two sets of SQOs?
 - Clear implications of policy language
 - Predictability and flexibility

Sediment Management in Washington State

PART 2 - Table of Contents

- Part I:
 - Authorities (cleanup & water quality regulations)
 - Purpose (protection of environment & human health)
 - Applicability (source control and cleanup)
 - Policies (e.g., antidegradation)
- Part II: Definitions

Sediment Management in Washington State

PART 2 - Table of Contents

- Part III: Sediment Quality Standards -
general features and reserved sections
- Part IV: Sediment Source Control -
goals and sediment impact zones
- Part V: Sediment Cleanup Standards -
 - process and policies
 - creating a ranked list of sediment cleanup sites

Sediment Management in Washington State

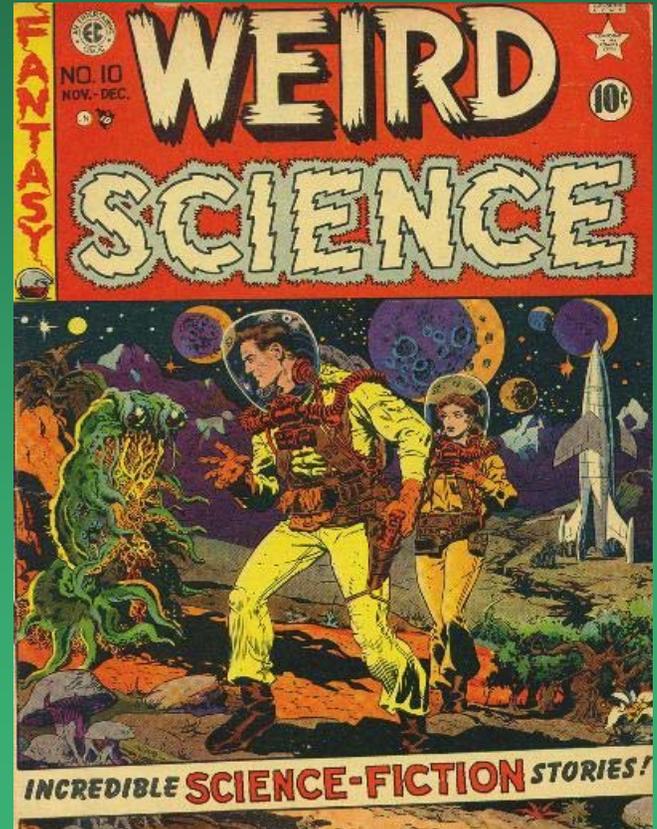
PART 2 - Table of Contents

- Part V: Sediment Cleanup Standards -
 - types of cleanups
 - cleanup studies
 - cleanup goals (SQS) and action decisions
 - sediment recovery zones
- Part VI: Sampling/Testing Plans & Records

Sediment Management in Washington State

PART 2 - “Up Front”

- Antidegradation policy
- “Latest science” *not* →
- Incorporates PSDDA guidelines by reference



Sediment Management in Washington State

PART 2 - ‘Alphabet Soup’

- Sediment Quality **B**enchmarks
- Sediment Quality **C**riteria
- Sediment Quality **G**uidelines
- Sediment Quality **O**bjectives
- Sediment Quality **S**tandards
- Sediment Quality **V**alues

Sediment Management in Washington State

PART 2 - Development of SQVs for the SMS Rule

- Reviewed available methods
- Selected Apparent Effects Threshold (AET) approach (used to derive 1986 AETs for Commencement Bay site)
- Used 1988 AETs as basis of PSDDA guideline values and SMS sediment quality criteria

Sediment Management in Washington State

PART 2 - Why AETs?

- Preferred empirical to theoretical approach, using regional instead of national data
- Preferred relationship to regional benthic communities
- Could reflect different levels of protection, with goal of protecting 95% of all species via use of multiple sets of AETs in combination
- Predictive ability evaluated, deemed adequate

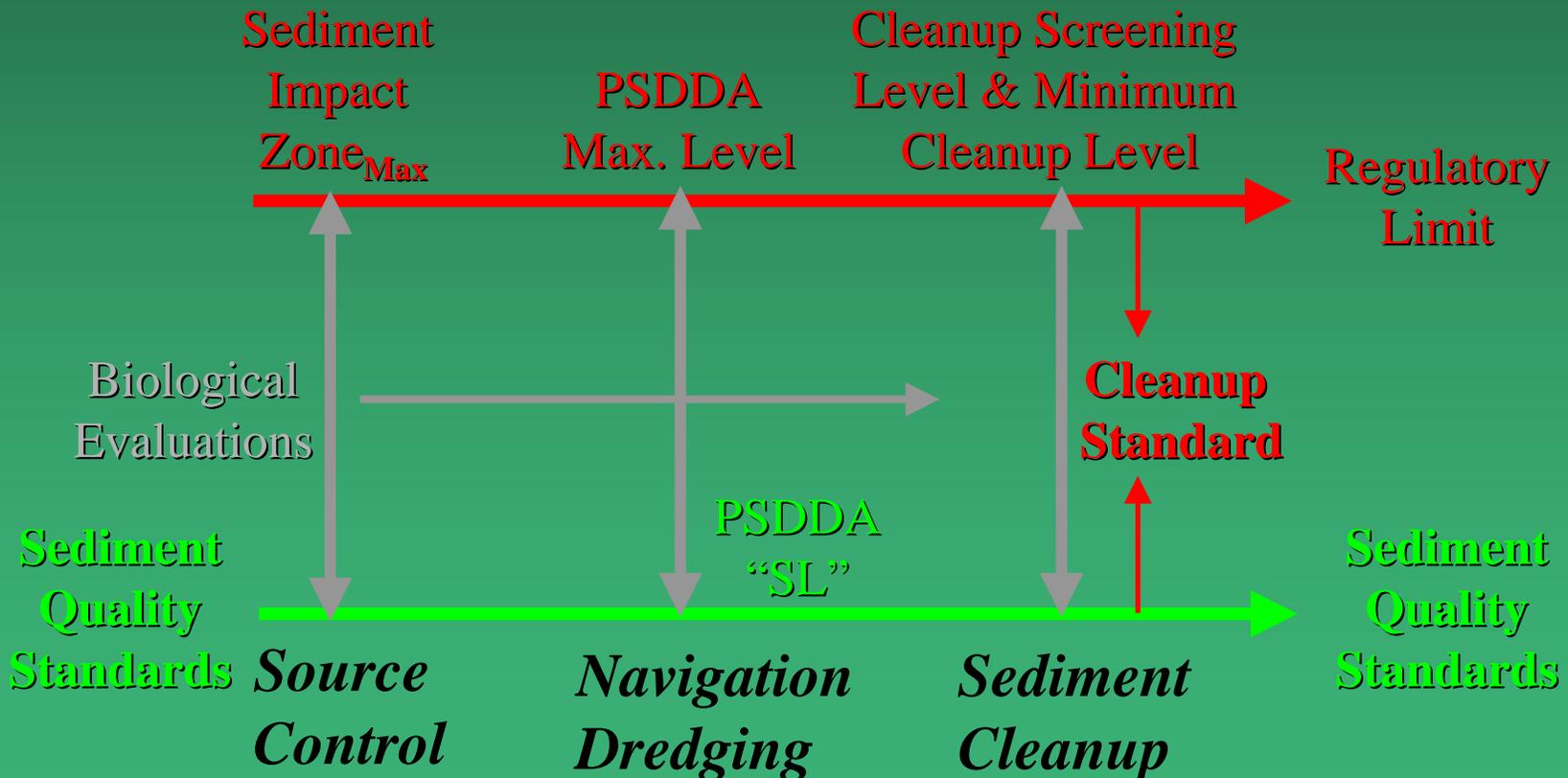
Sediment Management in Washington State

PART 2 - Regulatory Integration

- Two sets of PSDDA guidelines (Screening and Maximum Levels)
- Two sets of SMS criteria because of need for “Regulatory Beauty”
 - “No significant adverse effects” below lower set of guidelines/criteria
 - “Unacceptable adverse effects” above upper set of guidelines

Regulatory Beauty

“The interrelationship of sediment source control, cleanup and dredged material disposal programs”



Sediment Management in Washington State

PART 2 - Regulatory Impacts

- General
 - Costs to prepare/submit sampling and analysis plans, quality assurance project plans, etc. for agency approval
 - Costs associated with collecting sediment samples and testing for chemicals of concern
 - Costs associated with any biological testing, e.g., triggered by exceedance of SQS

Sediment Management in Washington State

PART 2 - Regulatory Impacts

- Sediment Source Control
 - “Requirement” to sample receiving sediments (as part of NPDES or state discharge permit) *if* discharge predicted to cause significant adverse effects to benthic community
 - Areas exceeding sediment standards placed on 303(d) list of impaired water bodies, → TMDL?
 - “Requirement” to apply for Sediment Impact Zone authorization

Sediment Management in Washington State

PART 2 - Regulatory Impacts

- Sediment Cleanup
 - Areas exceeding Cleanup Screening Levels (CSLs) may be placed on sediment site list
 - Such areas are required to
 - conduct site investigations, e.g., RI/FS
 - cleanup down to at least the Minimum Cleanup Level (MCUL)
 - SMS used ARAR at CERCLA sediment sites

Sediment Management in Washington State

PART 3 - Navigation Dredging

- PSDDA expanded to become Dredged Material Management Program (DMMP)
- 4 partners, U.S. Army Corps lead agency
- Predictable sediment evaluation framework
 - Standard sampling and analysis methods
 - Screening & maximum level chemical SQGs
 - Tiered biological evaluations, e.g., bioassays

Sediment Management in Washington State

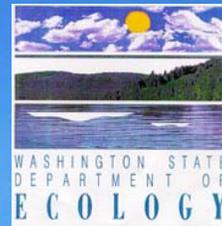
PART 3 - Navigation Dredging

- Joint, weight-of-evidence determinations on suitability for open-water disposal
- Cost effective open-water disposal at one of seven permitted disposal sites
- Post-disposal, confirmatory site monitoring
- Annual program reviews
- Fifteen years of successful implementation



SEDIMENT MANAGEMENT ANNUAL REVIEW MEETING

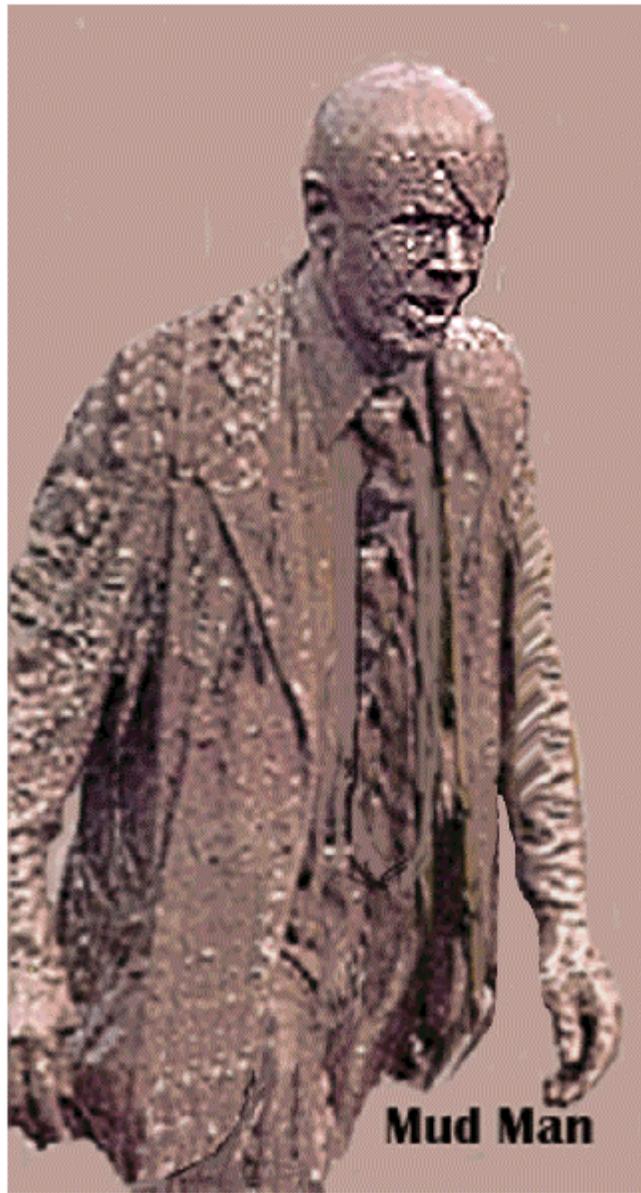
May 5, 2004




United States
Environmental
Protection Agency



WASHINGTON STATE DEPARTMENT OF
Natural Resources



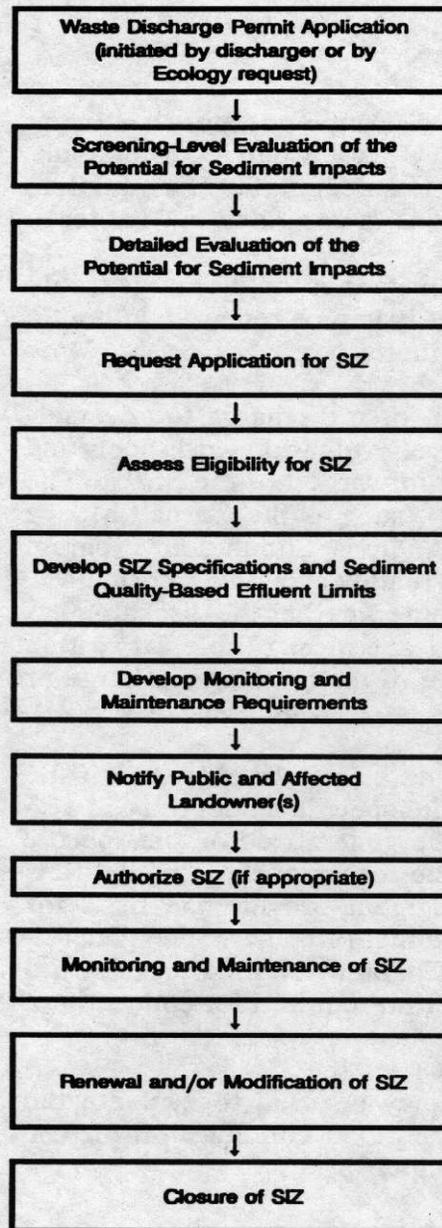
Mud Man

Sediment Management in Washington State

PART 4 - Sediment Source Control

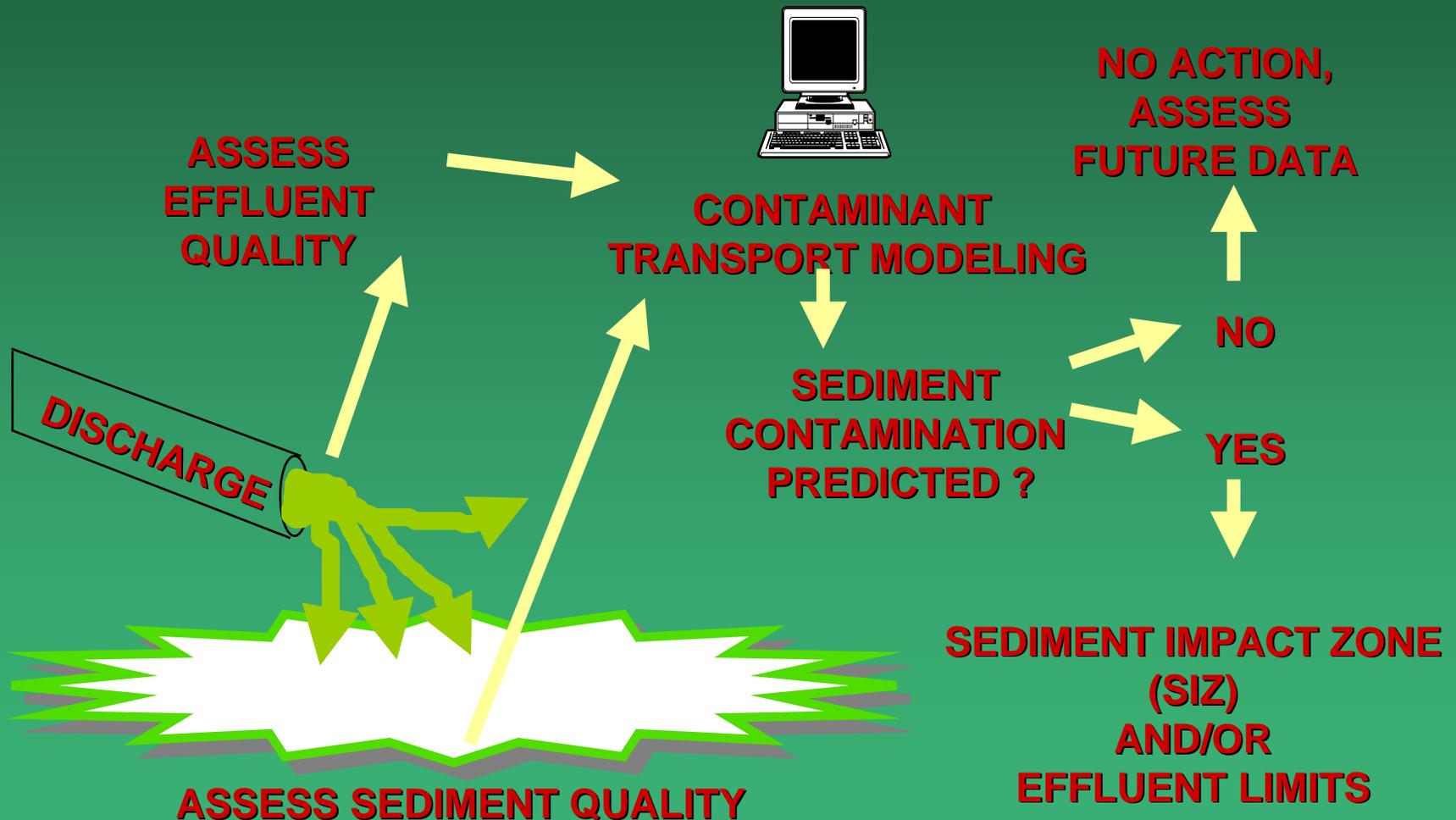
A federally-approved water quality standard, SMS:

- Can influence discharge permits (NPDES or state)
- Aids in compilation/revision of 303(d) list
- Can lead to sediment TMDLs
- Can lead to authorization of sediment impact zones (SIZ)



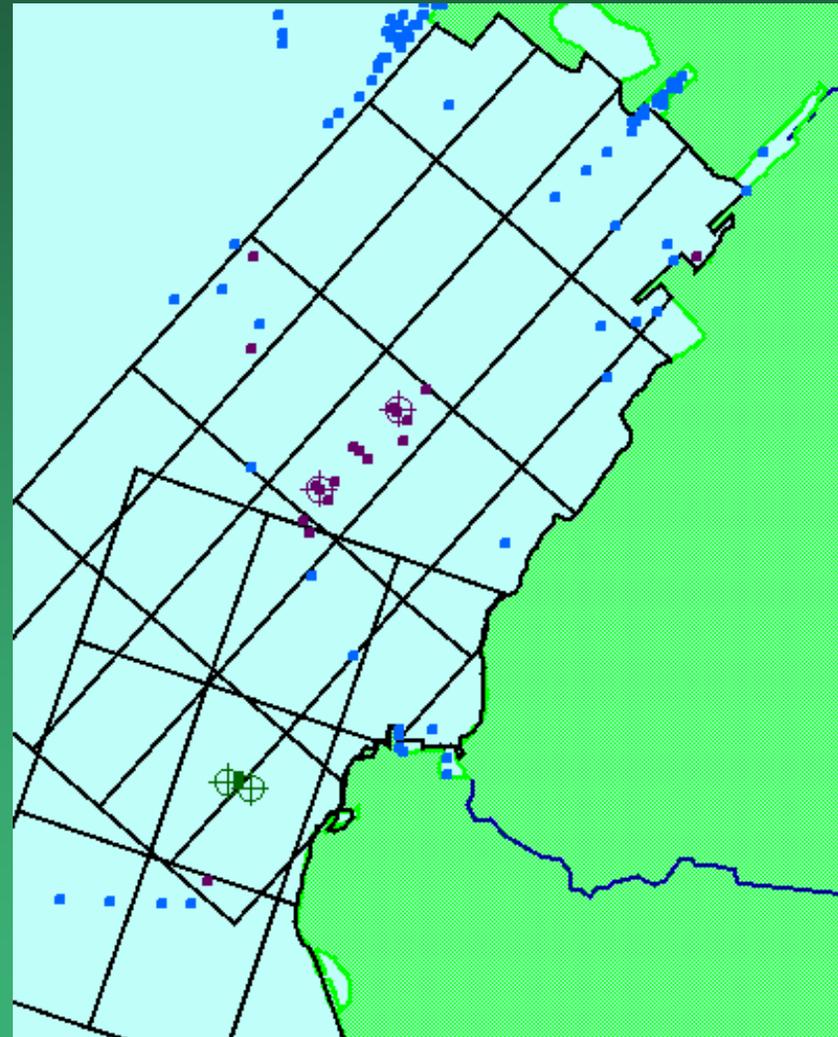
Note: SIZ - Sediment Impact Zone
SMU - Sediment Management Unit
WAC - Washington Administrative Code
WQP - Water Quality Program

Sediment Source Control Process



Sediment Contaminant Modeling

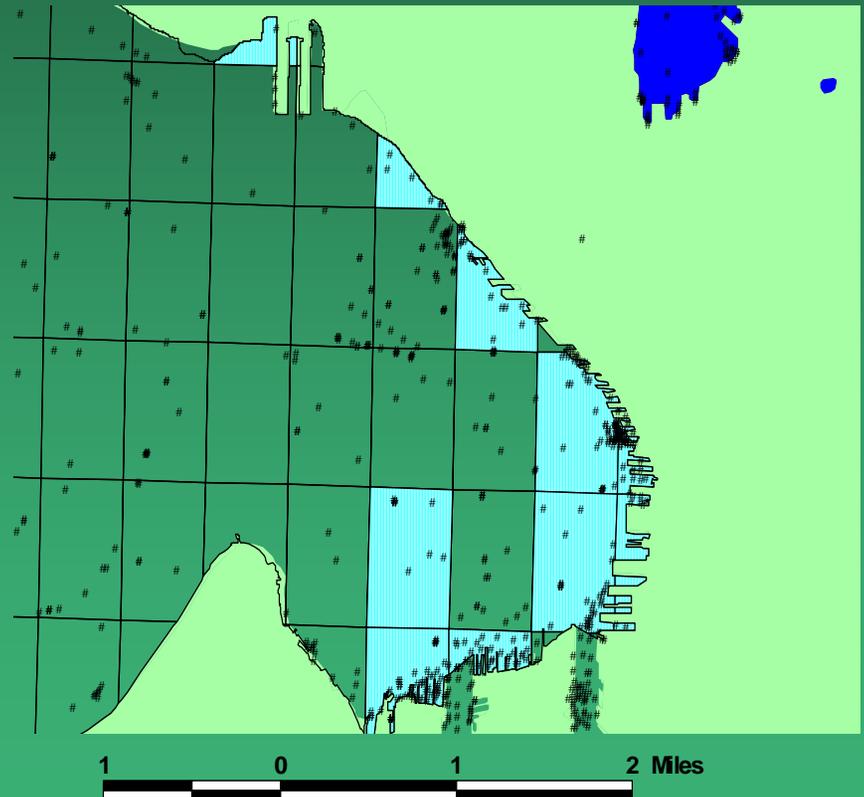
- **WASP** for modeling the effects of discharges
- Used to predict future sediment concentrations based on current discharges
- **Bellingham Bay**



The 303d List

- Clean Water Act requirement
- List of impaired waterbodies
- Sediments are considered “water”
- Beginning of the TMDL process

Elliot Bay 1998 listings



Sediment Management in Washington State

PART 5 - Sediment Cleanup

- Describes processes to list and rank sediment cleanup sites
- First sediment cleanup site list included 49 sites (1996)
- Approximately 120 sites now
 - 3/4 marine sediment cleanup sites
 - 1/4 freshwater sediment sites

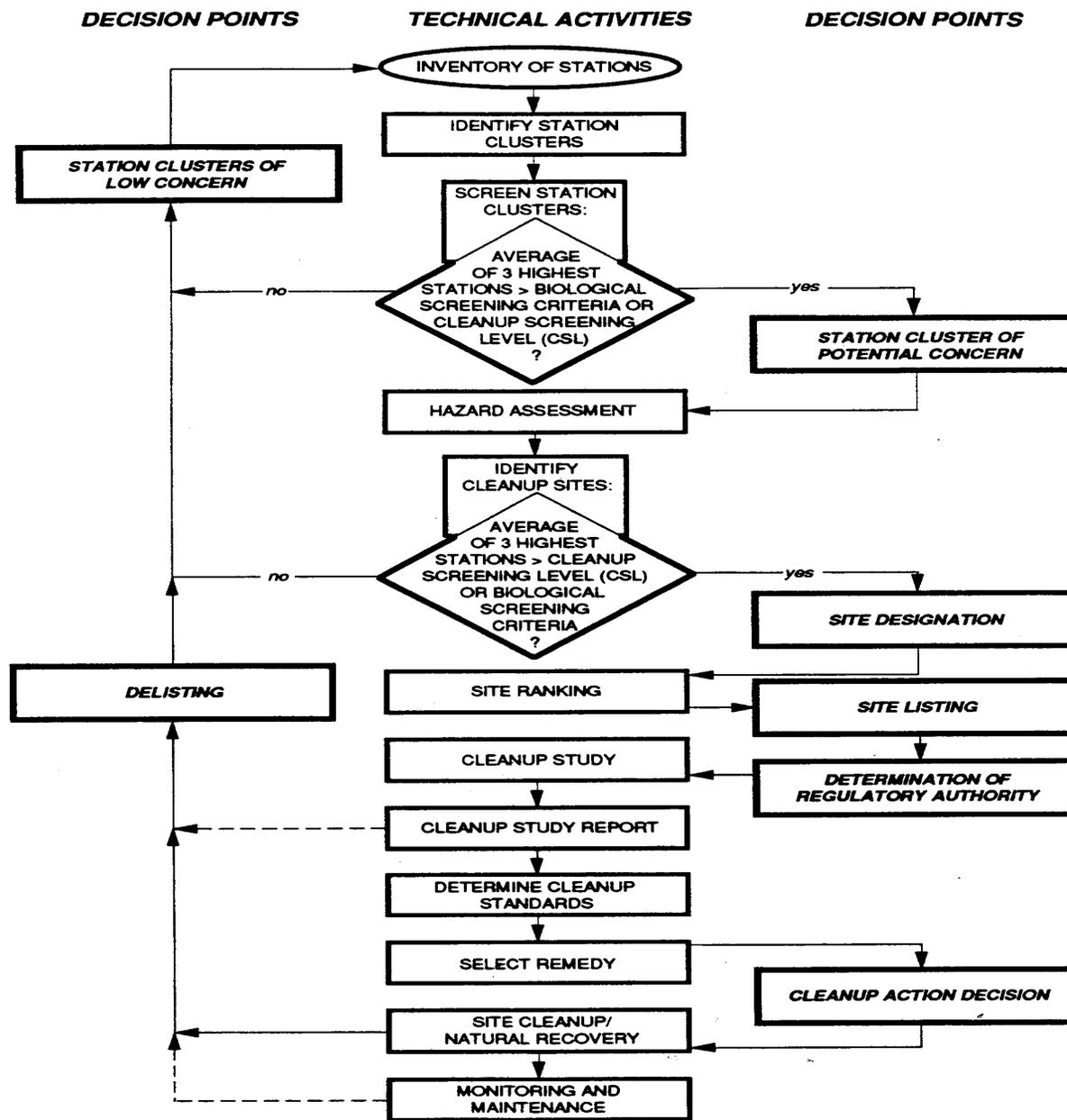
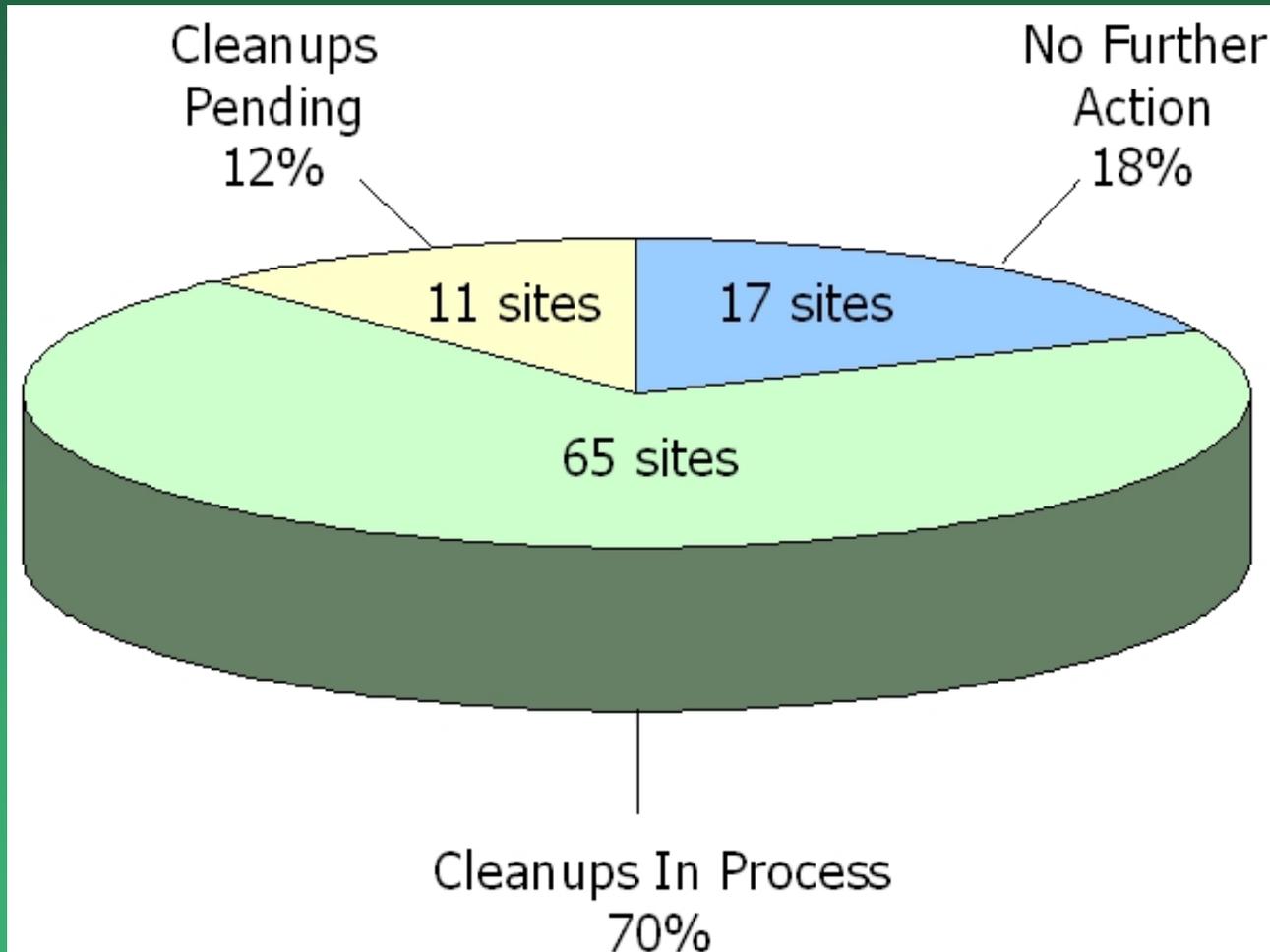


Figure 1-1. Contaminated sediments cleanup decision process.

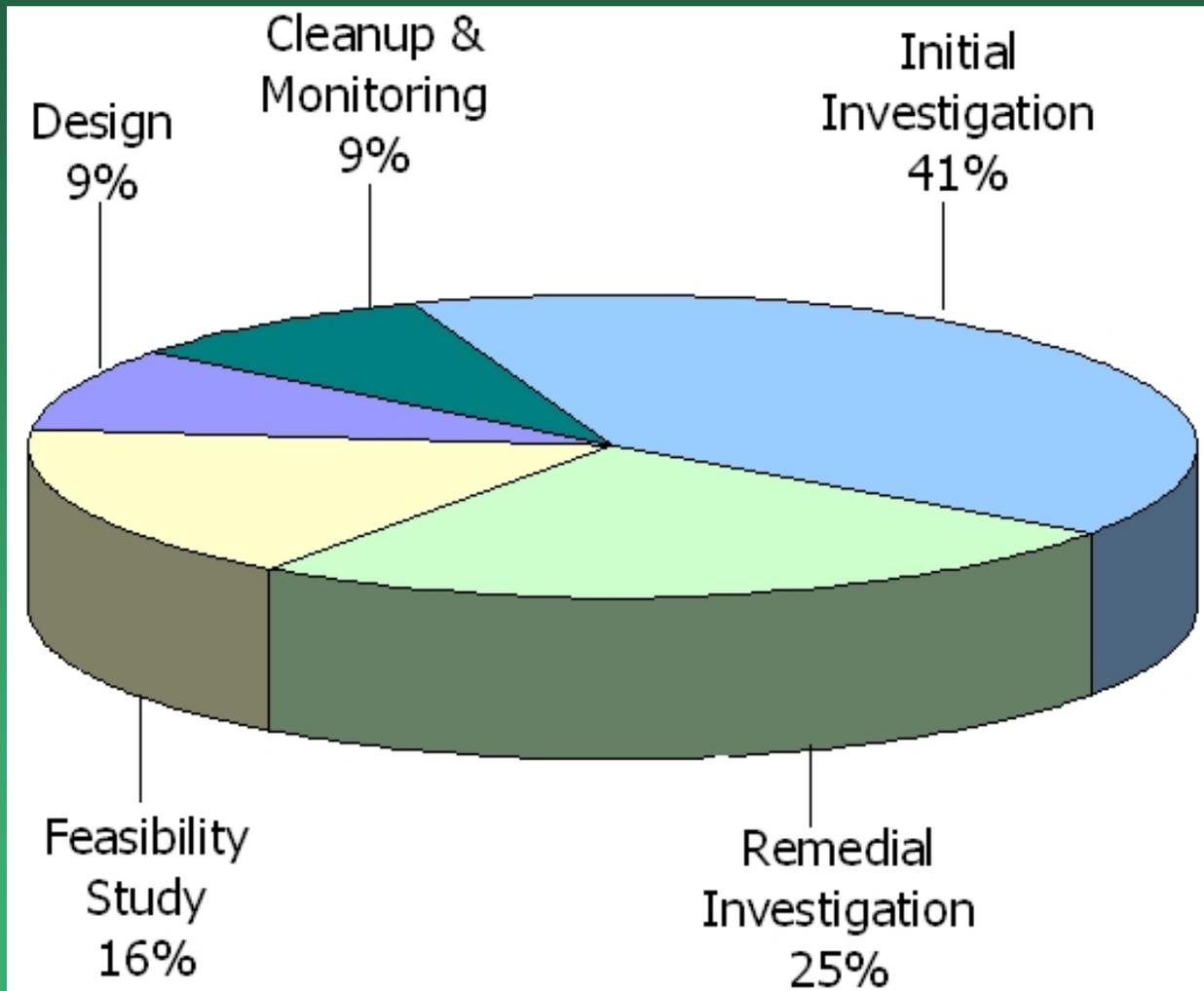
Sediment Cleanup Progress

Status of 93 marine sites



Sediment Cleanup Progress

Phase of cleanup, 65 marine sites



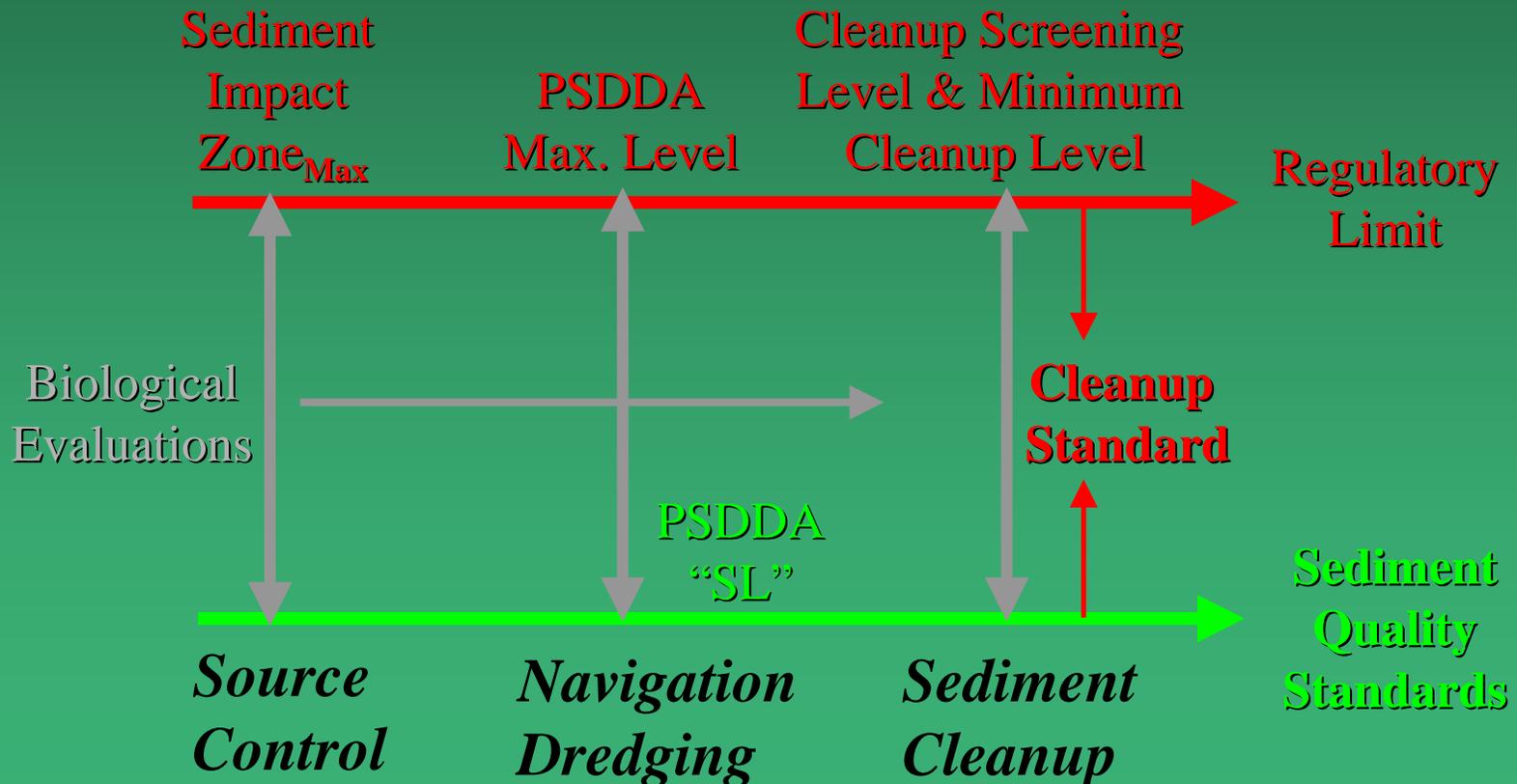
Sediment Management in Washington State

PART 5 - Sediment Cleanup

- Describes a cleanup process that uses chemical and biological sediment quality standards
 - to define site and “hot spots” boundaries
 - to set remedial action objectives within an acceptable range (considerations include cost, technical feasibility and net environmental effects)

Regulatory Beauty

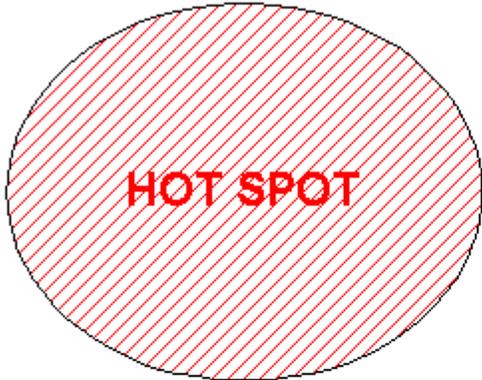
“The interrelationship of sediment source control, cleanup and dredged material disposal programs”



Area Exceeding
Sediment
Quality
Standards Goal



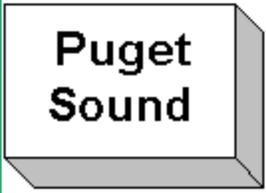
Sediment
Cleanup
Site



HOT SPOT

Area Exceeding
Minimum
Cleanup Level

Puget
Sound



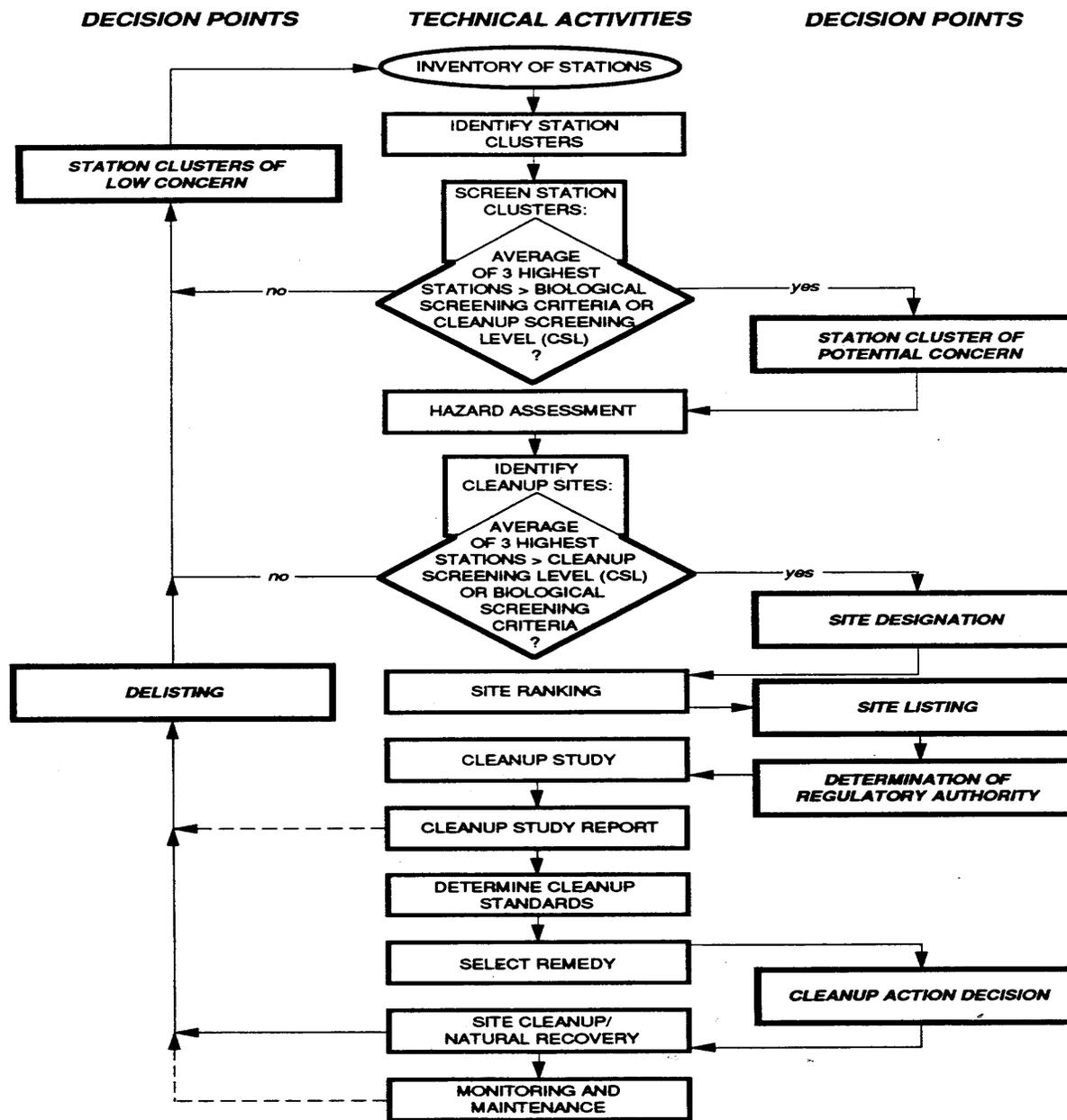


Figure 1-1. Contaminated sediments cleanup decision process.

Sediment Management in Washington State

PART 6 - DMMP Lessons

- Program works extremely well
- Evaluation procedures predict biological effects with low false negative error rate
- Few data difficult to interpret

Sediment Management in Washington State

PART 6 - DMMP Lessons

- >90% of all dredged material evaluated found suitable for open-water disposal
- Disposal site conditions meet goals
- “Z” sample data often important
- Need more beneficial use guidance

Sediment Management in Washington State

PART 6 - DMMP Lessons

- Program guidelines should not be used to conduct /effect cleanups
- Technical issues:
 - TBT evaluations - what's the best approach?
 - Change toxicity protocols and/or guidance?
e.g., more sensitive marine test organisms
 - Lack freshwater biological test experience
 - Need new bioaccumulation trigger values and target tissue levels

Sediment Management in Washington State

PART 6 - Source Control Lessons

- Larger outfalls often located in high energy areas so receiving sediments tend not to accumulate contaminants
- Permits for some some larger NPDES discharges do require sediment monitoring
- Smaller outfalls, especially stormwater outfalls, are another matter

Sediment Management in Washington State

PART 6 - Source Control Lessons

- What is the legally defensible way to use SQS/MCUL values to revise 303(d) list?
- How to relate sediment contamination to TMDLs?
- Case Study 1 - Bellingham Bay
 - First TMDL for sediment toxics

Sediment Management in Washington State

PART 6 - Source Control Lessons

- Case Study 2 - Duwamish Waterway
 - EPA cleanup lead, Ecology source control lead
 - Overall strategy
(<http://www.ecy.wa.gov/biblio/0409043.html>)
 - 489 source control business inspections
 - Source Control Action Plans for three EPA early action sites completed or underway
 - “Hot spot” cleanup to prevent recontamination



Sediment Management in Washington State

PART 6 - Cleanup Lessons

- Need clear links between SMS rule and “parent authorities”
- Need to develop low salinity and freshwater sediment quality standards
- Sediment cleanup site decisions often being “driven” by risk to non-benthic organisms - need more guidance on ecological and human health risk assessments

Sediment Management in Washington State

PART 6 - Cleanup Lessons

- Need to define how “local background” is calculated for a given contaminant?
- How to address risk to endangered species in cleanup investigations, final decisions?
- How to investigate risk at wood waste cleanup sites?

Sediment Management in Washington State

PART 6 - Cleanup Lessons

- Substantial State liability associated with contaminated sediment cleanup sites
- Has reducing cost of upland disposal affected overall time required for cleanup?
- Need for better oversight when contractors dredging contaminated sediment
- When/how to monitor for compliance with antidegradation policy?

Sediment Management in Washington State

PART 6 - Cleanup Lessons

- Major challenges to developing large-scale treatment of contaminated sediment from the Puget Sound region:
 - Unproven economies of scale and unproven markets for products
 - Unpredictable flow/supply of contaminated sediment
 - Public perception of thermal treatment

Sediment Management in Washington State

PART 6 - Cleanup Lessons

- Place-based comprehensive planning advantageous
- Bellingham Bay Pilot Project



Legend

- Rivers
- Fairway
- Sites

0 0.2 0.4 0.8 Miles

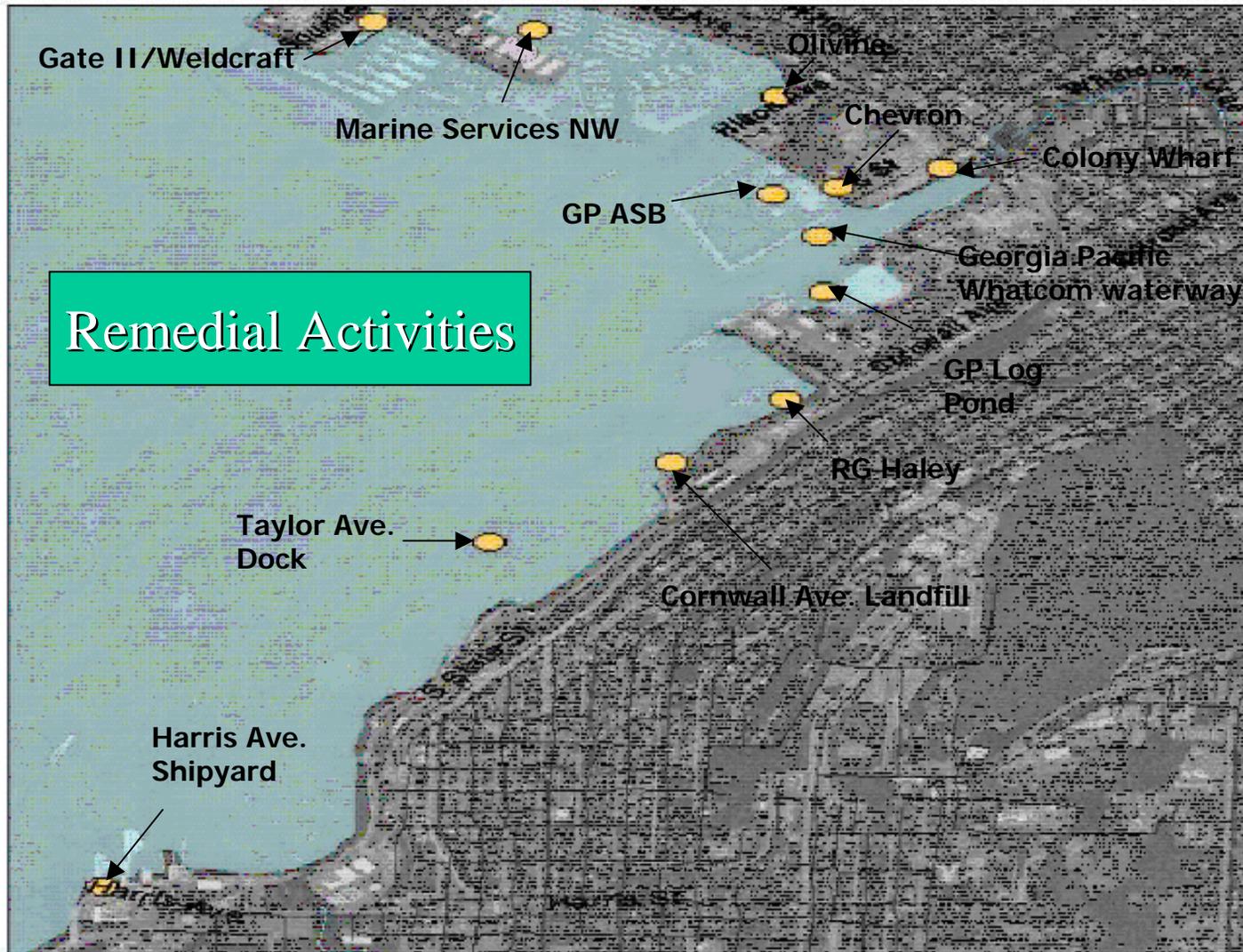


Sediment Management in Washington State

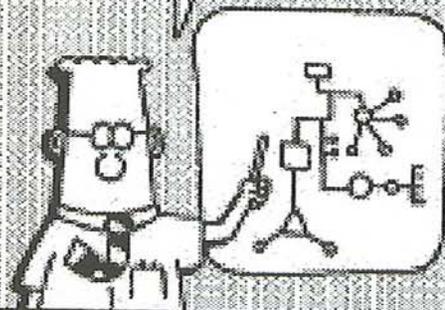
PART 6 - Bellingham Bay Pilot

- Goal - to expedite environmental improvements within an urban embayment through development and implementation of a new cooperative process
 - addresses all major sediment related issues
 - involves partnerships with local government(s)
 - prioritizes cleanups, source controls, habitat protection/restoration, recreation, etc.

Bellingham Bay Demonstration Pilot



AS YOU CAN
CLEARLY SEE
IN SLIDE
397...



www.dilbert.com scottadam@aol.com

GAAAAH!



© 2000 United Feature Syndicate, Inc.

"POWERPOINT"
POISONING.

